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I. Introduction

It is reasonable that people living in small countries should have an interest in their own conditions and how they are different from larger countries. This interest is the source of much of the economics literature that exists on the economics of small countries, a literature, which, though modest, has, nonetheless, identified most of the issues involved.[1] It is less obvious why there should be a more general interest in the subject and in fact small countries have received only irregular attention from the economics profession.[2] Yet there are also reasons why the economies of small countries are of general interest, which have to do with the familiar issues of efficiency and equity..

There is a, "wrong end of the telescope," or Liliputian conception of small countries that would claim that small countries are large countries in miniature.[3] There is everything in a small country that would be expected in a large country, it is just that all aspects are fewer or smaller. There is every kind of worker and every kind of production: brain surgeons and corporate lawyers, nuclear physicists and teachers and grocery stores of all kinds and auto repair shops and automobile production plants. There are just not as many of each type of worker and less of each type of production than in larger countries. However, although on a smaller scale, everything functions just as well in small as in large countries.

The opposite view is that small countries really are different from large countries, more like small towns in large countries than they are like miniature versions of larger countries. It is not only that there are fewer doctors, lawyers and teachers, grocery stores and auto repair shops in small countries than in large countries. There is also a more limited

range of economic activities, including a more limited range of labor and professional specialists, and many production activities of large countries do not exist at all or only in smaller proportions than the ratio of populations.

Thus, an efficiency question emerges, as to whether resources, primarily labor and capital, are as productive in small as compared to larger countries. The answer is, of course, important for people living in small countries. It is also of general interest, because much of the contemporary theorizing about economic growth emphasizes the advantages of large size from lower production costs, i.e. economies of scale. Interestingly, this view is also commonly accepted in most of the economic analysis of small countries: that they do face special difficulties, because they cannot take full advantage of economies of scale.

There are also equity issues that arise in several ways. Because of their smaller markets, small countries may be more exposed to local monopoly power. If they want to place their international bonds or borrow from international banks, they may receive less attention and face higher costs. In international negotiations their economic interests may be discounted, as compared to those of larger countries. It has also been argued that small countries receive less economic assistance, on a per capita basis, because they are small. Such treatment, even if not pernicious in intent, would, nonetheless, be an additional handicap.

On the other hand, if one believes the posters in the offices of travel agencies, small countries are especially happy, cozy, friendly and, sometimes, quaint places. No one would describe China, India, the United States, or, on a smaller scale, Argentina or France as cozy places. If small countries do have special advantages in the quality of life they offer, that

might to some extent offset any economic disadvantages.

In discussing these issues it is necessary to be specific as to what is meant by "small countries". So that matter will be taken up first and then the specific characteristics of small countries will be discussed. That discussion will inform the subsequent analysis of why the differences exist and how they affect economic growth.

II. The identification of small countries

Yet even before trying to be precise as to what is meant by smallness in country terms, it is worth stopping for a moment to think about whether national distinctions are really important. If not, there would be no point in going on. It is fashionable to argue that, in important political and social aspects, as well as for some economic conditions, national boundaries are becoming irrelevant. Newspaper and magazine articles and public figures cite the growth of global markets and multinational corporations. They claim there is an internationalization of consumer tastes, represented, for example, by the world wide spread of Coca Cola and McDonald's hamburgers. The power of international financial markets that can bend mighty nations is reported in our newspapers. It is suggested that all of this means that national distinctions are no more important than, for example, the distinctions between St. James and Christ Church parishes in Barbados.

No doubt, this is much more "one world" than it was 40 or 50 years ago, when the developing countries began to receive concentrated attention and economic assistance. Yet casual empiricism is sufficient to deny that national boundaries are irrelevant, economically, politically or socially. The evidence in our daily press indicates that, rather than becoming less important, language and national differences are becoming more significant. Witness, for

example, the separatist movements around the world, from Canada to Italy to Eastern Europe and the fission of the former Soviet Union. The intense political and economic rivalries of small as well as large countries are prominent in the daily news. If it were really so, that national boundaries were becoming less important, we would expect also that international politics would become less salient, but that certainly is not true.

Within in the economics profession there appears to be no doubt about the importance of national sovereignty. It generates the national economic policies and tariffs and quotas on international trade and the constraints on the mobility of capital and labor that are the subject of intense analytical scrutiny.

Yet, there is an issue, more important for small countries than for large, as to what constitutes a separate country. Consider, for example, the Marshall Islands and the Federated States of Micronesia, which are small island countries of the Pacific. They describe themselves as being, "freely associated," with the United States. They became protectorates of the U.S. after World War II and then became independent in 1978. At that time they were given special privileges, vis-a-vis the U.S., that other countries do not have. They get large per capita annual grants from the U.S. and can ask for and obtain services from U.S. government agencies without payment. They use the U.S. dollar as their currency. Their citizens can immigrate to the U.S. without the barriers that citizens of other countries face. Yet they have separate representatives at the United Nations and some separate embassies around the world. Although independent from the United States, the Marshall Islands and the Federated States of Micronesia are independent in a different way than are Barbados or Brazil. The internally self governing Crown colonies of the United Kingdom provide other

examples of the difficulties of identifying separate countries.

Having raised the issue as to what constitutes a separate country, it will be finessed here without inquiring further by considering national units to be those that are internally self-governing, recognizing that sharp distinctions are impossible, as there are degrees of self-governing.

With respect to the dimension to be used in measuring size, the focus will be on issues related to population. For some purposes, which will not be taken up here, it is most important to think about country size in terms of a measure of its total output. Countries that are large in terms of total GNP, whether because of their per capita income or their population numbers, have a greater influence on the world economy than countries which are small. Although there are several countries with higher per capita incomes than the United States, they are not considered "superpowers", because they are not nearly so populous and their total GNP is substantially less. On the other hand, China has been the most populous country in the world for as long as any one can compare population sizes. Yet it is only recently, because of its extraordinary economic growth, that it has become a candidate for superpower status. It is the total size of its markets that attracts the attention and investment that a small country with roughly the same per capita income, for example, Papua New Guinea, does not get.

Now the problem can be addressed of defining, "smallness." How small is small? There are no apparent boundaries that say, "On this size, small, on the other size large." At what point do countries change from being small to, say, medium sized or large? Since there is no obvious line of demarcation between "small" countries and all the rest, it will be useful

to present a few numbers describing the size distribution of the countries of the world.

The World Bank Tables of 1993 provide population information for 194 separate countries, ranging from the 1.2 billion people in China to the 30,000 people of Gibraltar and the 40,000 people in St. Kitts and Nevis. The median country size is a population of less than 5 million people. If, as seems to be conventional, a country of 5 million people is considered a small country, then half of all the countries of the world are small. One quarter of the countries of the world have populations of less than 500,000 people. Thus, though one might think from relative the lack of attention that they have received, that small countries are unusual, they are really quite numerous.

There are no obvious discontinuities in the population size distribution, except at the upper end of the scale. China is about 40 per cent larger than India, which is 2.5 times larger than the U.S., the next largest country. The U.S. is 40 per cent larger than Indonesia, which, in turn, is a third larger than Brazil. These size differences are much larger than are found elsewhere between adjacent countries in the population size distribution. Typically, the differences between the next largest or smallest country are 10 per cent or less, although, occasionally, the differences are in the 20 per cent range.

Lacking clear discontinuities in most of the population size distribution, some order of magnitude distinctions will be used to provide an overall description. As shown in Table 1, moving from the largest to the smallest country covers five orders of magnitude: China, the most populous country, is, roughly 100,000 times larger than the smallest country. There are 8 countries within an order of magnitude of the population of China, from China's 1,150 million to Pakistan's 116 million people. There are 53 countries in the next order of

TABLE 1[4] - DISTRIBUTION OF COUNTRIES BY POPULATION SIZE (000)

1 - Gibraltar	30	50 - Reunion	602
2 - St. Kitts & Nevis	39	51 - Cyprus	710
3 - American Samoa	40	52 - Fiji	741
4 - Faeroe Islands	47	53 - Guyana	802
5 - Marshall Islands	50	54 - Swaziland	828
6 - Andorra	52	55 - Gambia, The	902
7 - Greenland	56	56 - Guinea-Bissau	1001
8 - Aruba	61	57 - Mauritius	1087
9 - Bermuda	61	58 - Gabon	1168
10 - Seychelles	69	59 - Trinidad & Tobago	1253
11 - Isle of Man	70	60 - Botswana	1319
12 - Dominica	72	61 - Kuwait	1460
13 - Kiribati	73	62 - Namibia	1482
14 - Mayotte	73	63 - Estonia	1562
15 - Antigua & Barbuda	79	64 - Oman	1583
16 - Grenada	91	65 - United Arab Emir.	1629
17 - Virgin Islands	99	66 - Lesotho	1813
18 - Tonga	100	67 - Mauritania	2025
19 - Fed.States of Micro.	103	68 - Mongolia	2250
20 - St. Vincent	108	69 - Congo	2350
21 - Sao Tome and Prin.	118	70 - Jamaica	2376
22 - French Guiana	123	71 - Panama	2466
23 - Guam	145	72 - Liberia	2639
24 - Channel Islands	145	73 - Latvia	2641
25 - Vanuatu	151	74 - Singapore	2763
26 - St. Lucia	153	75 - Costa Rica	3064
27 - Western Samoa	161	76 - Central African Rep.	3086
28 - New Caledonia	171	77 - Uruguay	3112
29 - Belize	188	78 - New Zealand	3406
30 - Netherlands Antilles	192	79 - Armenia	3418
31 - French Polynesia	202	80 - Ireland	3522
32 - Maldives	214	81 - Puerto Rico	3551
33 - Bahamas	255	82 - Jordan	3664
34 - Brunei	256	83 - Lebanon	3708
35 - Iceland	258	84 - Lithuania	3741
36 - Barbados	259	85 - Turkmenistan	3758
37 - Solomon Islands	325	86 - Togo	3773
38 - Malta	357	87 - Nicaragua	3794
39 - Martinique	363	88 - Papua New Guinea	3964
40 - Cape Verde	380	89 - Sierra Leone	4243
41 - Luxembourg	385	90 - Lao, PDR	4261
42 - Guadeloupe	395	91 - Norway	4262
43 - Equatorial Guinea	427	92 - Moldova	4363
44 - Djibouti	427	93 - Paraguay	4397
45 - Suriname	457	94 - Kyrgyzstan	4453
46 - Macao	476	95 - Libya	4706
47 - Comoros	492	96 - Israel	4946
48 - Qatar	506	97 - Finland	5029
49 - Bahrain	516	98 - Denmark	5154

TABLE 1-DISTRIBUTION OF COUNTRIES BY POPULATION SIZE(continued)

99 - Honduras	5259	147 - Sri Lanka	17190
100 - El Salvador	5278	148 - Australia	17292
101 - Tajikistan	5465	149 - Malaysia	18178
102 - Georgia	5478	150 - Iraq	18578
103 - Burundi	5653	151 - Nepal	19401
104 - Hong Kong	5755	152 - Venezuela	19787
105 - Chad	5826	153 - Uzbekistan	20886
106 - Guinea	5880	154 - Afghanistan	20979
107 - Haiti	6593	155 - Peru	21945
108 - Switzerland	6791	156 - Korea,Dem.Rep.	22191
109 - Azerbaijan	7121	157 - Romania	22974
110 - Rwanda	7125	158 - Yugoslavia	23928
111 - Dominican Republic	7197	159 - Kenya	25006
112 - Bolivia	7347	160 - Tanzania	25201
113 - Senegal	7625	161 - Morocco	25668
114 - Austria	7823	162 - Algeria	25680
115 - Niger	7911	163 - Sudan	25836
116 - Somalia	8051	164 - Canada	27300
117 - Tunisia	8237	165 - Argentina	32713
118 - Zambia	8319	166 - Colombia	32841
119 - Sweden	8635	167 - Poland	38245
120 - Mali	8707	168 - Zaire	38631
121 - Cambodia	8790	169 - South Africa	38858
122 - Malawi	8796	170 - Spain	39025
123 - Bulgaria	8975	171 - Korea, Rep.	43268
124 - Burkina Faso	9272	172 - Ukraine	52031
125 - Guatemala	9467	173 - Ethiopia	52792
126 - Portugal	9852	174 - Egypt	53602
127 - Belgium	10004	175 - France	57049
128 - Zimbabwe	10079	176 - Thailand	57151
129 - Belarus	10316	177 - Turkey	57326
130 - Greece	10330	178 - United Kingdom	57564
131 - Hungary	10344	179 - Iran	57727
132 - Cuba	10736	180 - Italy	57764
133 - Ecuador	10782	181 - Philippines	62868
134 - Cameroon	11881	182 - Viet Nam	67679
135 - Madagascar	12032	183 - Germany	80129
136 - Cote d'Ivoire	12360	184 - Mexico	83306
137 - Syria	12529	185 - Nigeria	98983
138 - Yemen, Rep.	12544	186 - Bangladesh	110564
139 - Chile	13386	187 - Pakistan	115844
140 - Netherlands	15065	188 - Japan	123921
141 - Ghana	15336	189 - Russian Federation	148700
142 - Saudi Arabia	15381	190 - Brazil	151428
143 - Czechoslovakia	15692	191 - Indonesia	181305
144 - Mozambique	16128	192 - United States	252688
145 - Kazakhstan	16844	193 - India	866499
146 - Uganda	16899	194 - China	1149523

magnitude, from Bangladesh's 110 million down to Cameroon's 11.9 millions people. There are 76 countries in the third order of magnitude, down to Gabon's 1,168,000 people. From there, the next order of magnitude distinction moves to Sao Tome and Principe, with a population of 118,000 and includes 37 countries. There are 20 countries with a population size even less than that.

There is obviously a high degree of concentration of population in the largest countries. China and India, alone, have 38 per cent of the world's population. Seventy five per cent of the total population of the world is in the largest 10 per cent of the countries. The smallest 50 per cent of all the countries in the world have less than 3 per cent of the total population of the world.

One feature of small countries, up to 1 million people, is that they are likely to be islands. In the 20 countries in the fifth order of magnitude, with populations of roughly 100,000 or less, all are islands, with the exceptions of Gibraltar and Andorra. In the roughly 40 countries with populations ranging up to just over 1,000,000, the fourth order of magnitude countries, 25 are islands. The small island countries are spread around the world, with concentrations in the Caribbean, the South Pacific and the Indian Ocean. The small continental countries are also spread around the world, but concentrated in Africa and Central and South America, with a few in Europe and Asia and none in North America.

The more populous countries are seldom islands, yet Indonesia, Japan and the Philippines, three of the most populous countries, are also island countries. However, it would be more proper, however to describe the Indonesia, Japan and the Philippines as archipelagoes, including, in each case, several very large islands, as well as many small ones.

England is an unusual populous country in that it is really not an archipelago.

III. The economic characteristics of countries of different sizes

An inspection of Table 1 is enough to verify that there is no simple relationship between GNP per capita and country size. Yet, in the group of 30 countries with populations of less than 200,000 people, there are no really rich countries. In this group, by the way, Antigua and Barbuda has one of the highest per capita incomes.[5]

Moving up through the size range of countries, in the fourth order of magnitude countries, with populations between, roughly, a million and 100,000, there are great differences. This group includes the relatively prosperous Barbados, The Bahamas, Cyprus, Iceland, Luxembourg, Bahrein and Oman and also a number of desperately poor countries, mainly in Africa, such as Equatorial Guinea, The Gambia, Guinea-Bissau and Mauritius.

In the next largest size range, there are also great differences, but now the poorest countries are not mainly African, but also include Haiti, Honduras and Nicaragua, in this hemisphere, as well as the rich countries of Finland, Norway and Switzerland.

The variance in per capita incomes is highest among the most populous countries in the world, since that group includes the U.S., India and China. There is also a great deal of variance in the per capita incomes in the intermediate size groups. With one exception, within each size group, the differences have been reduced in recent years, after having grown larger in the 1970's and 1980's. The exception is the group of the most populous countries, for which the variance has increased.

The sources of income in the small countries also vary a great deal. Agricultural production tends to be of least importance in the very smallest countries and becomes more

important in the intermediate size classes. It is no surprise that the economies of smaller countries are more likely to be dominated by a single sector than is the case in larger countries. Oil exports have been the basis for the relative wealth of some of the small countries. That is true of Trinidad and Tobago in the Caribbean, which does not, however, hold a candle to the wealth of Bahrein and Kuwait. While oil has been an important contributor to GNP in the U.S. and in former Soviet Union, which are among the largest countries, it has not been so overwhelmingly important as in a number of small countries. The same is true of other primary commodities, from copper to tin.

Comparing across size classes, there is, in general, an inverse relation between size and the share of foreign trade in the economy. There is more uniformity in this characteristic among the smallest countries than for any other size class. The exports of primary commodities are, in general, of least importance to the largest countries. While the economies of some small countries are completely dominated by a primary commodity, this is less likely to be found among the very smallest countries. On the other hand, as might have been expected, tourism is of greatest importance for countries in the two smallest size classes and of least importance for the largest countries. Some of the South Pacific islands, by comparison, essentially live on the grants provided by the Australia, France and the United States.

These features are generally consistent with the "small town" view of small countries: they do not produce at home so much of the goods they consume as do the larger countries, are relatively specialized in their output mix and export or sell to tourists a larger share of the goods and services they produce than do large countries and buy abroad more of what they

demand. Yet, while the economic structure of small countries is, on the average, different from that of large countries, there is also great diversity among small countries. This lesson is important in the next step that inquires more deeply into the sources of the differences among small and large countries.

In the remainder of the paper, the convention will be followed of using, "small countries," to refer to the lower half of the size distribution and, "very small countries," to designate the lower quartile.

IV. The sources of the economic differences between large and small countries

Thus far, a rather casual empiricism has been used to examine some of the features of countries of different sizes that can be described from readily available data. That has, nonetheless, been sufficient to demonstrate that small countries are not like large countries and, in turn, are, themselves, not all alike. But casual empiricism will not reveal what difference size, itself, makes for economic growth and the many other country characteristics that are important for their peoples.

There are several economic theories which, although they do not deal directly with the relationship between country size and economic growth, do have implications for that relationship. The view that country size makes no difference for economic growth and per capita income levels would be consistent with the so-called neo-classical growth model. That model rests on the assumption of constant returns to scale in production. If there are constant returns to scale, small production units can be just as efficient as large production units. The assumption is an element of a still more comprehensive assumption that there is competition everywhere, in each industry and in each country. With constant returns to scale, no large

firm would have an advantage over a small firm. Monopolies, unless they were enforced by a state agency, could not prevent effective competition from emerging. With these assumptions, the neo-classical growth model leads to the conclusion that countries, regardless of size, would converge to the same levels of per capita income.[6]

Alternatively, if it is assumed that labor or capital could move freely into and out of any markets anywhere in the world, there would also be convergence across all countries toward the same levels of per capita income. If labor could move freely among countries, workers would migrate from low wage to high wage areas. If labor could not move freely, but capital could, it would move to the low wage countries and combine with the relatively cheap labor to produce goods at lower costs than would be possible elsewhere. Wages in the low income countries would then be bid up and wages in the higher income countries would fall, as capital moved away, and there would be movement toward equalization of per capita incomes across countries.

Even without complete factor mobility, if all goods and services produced moved freely in international trade, the result, of convergence of per capita incomes, would be the same. In this case, and with some additional technical, but plausible assumptions, trade would be an effective substitute for factory mobility.[7]

Another set of theories of economic growth that have been developed in the last ten years and have entered the main stream analysis are based on a quite different view of the world than that embodied in neo-classical growth theory. In contrast to the latter theory's assumption of constant returns to scale, a central proposition of much of the so-called "new growth theory" is that there are increasing returns to scale. In this view of the world, the

larger the economy, the more productive it will be and the higher the per capita income level of its population.

The new growth theory does not examine closely the sources of economies of scale, but there is an extensive literature on the subject and there seems to be little doubt as to its reality in many lines of production.[8] The evidence usually shows that average costs fall as the scale of production increases, up to some critical output level, after which unit costs do not continue to decline and may even increase. There is considerable variation in the least cost scale of output relative to markets.

Economies of scale exist in production of sugar and tea on plantations, but even the largest plantations are small relative to the world market. Producing steel in big factories is more efficient than producing it in backyard furnaces, as the Chinese found out in the 1950's, although the scale of least cost production has fallen significantly in the last 20 years or so, as the result of technological innovations. Economies of scale exist in some service industries as well, for example, in education, particularly higher and professional education, although, again, there is a limit here, as well.

Another important element in the new growth theory is the view that there are important positive "external economies", which are also "public goods", whose consumption is not exhaustible. These are influences which are not fully transmitted to private producers through market interactions. The effects may have their sources in economies of scale, but may have other sources as well. For example, the demands of one producer that lead to increased production will lower costs for all production as the result of economies of scale. There are other spillover effects that are less obvious. One that plays an important role in the

new growth theory is the economic benefits of education, which are not reflected fully in the opportunities and earning created for the individuals who get the schooling. There are advantages from education for all of society. Organization and communication can be improved to everyone's benefit. If new ideas and new technologies are generated through education, or more effective transfer of new ideas and technologies from foreign countries, then, again, there would be general as well as individual benefits. With externalities of this type, a large economy would benefit more than a small economy, because their overall factor productivity would be larger. This presumes that the externalities are kept within an economy. If they spread across national borders, then all countries will benefit. It is plausible, however, that capture of the benefits of new ideas and technologies requires education and training, which might again put small and poor countries at a disadvantage.

A strong implication of some of the new growth theories, as compared to the neoclassical growth theory, is that there need be no tendency for countries to converge to the same per capita output levels. The benefits of economies of scale and external economies may not flow easily across national boundaries. Or, even if they do, while raising income levels abroad, they would not necessarily generate convergence.

An entire intellectual industry has developed among economists in testing the convergence implication of neo-classical growth theory, as against the implication of non-convergence in new growth theory. The early econometric tests seemed to have confirmed convergence. These tests relied on comparisons across countries and across the states within the United States. The tests consisted of calculating regressions with overall growth rates over a period of time as the dependent variable and independent variables which include the

initial per capita income level and various non-market determined features of the economies. If there were convergence, the regressions should show a negative relation between the initial income level and subsequent growth. That is, countries with relatively low initial income levels should subsequently grow faster in order to catch up with the countries with higher incomes. This result did emerge from the first tests.[9]

Subsequent tests, using time series data and different statistical techniques, have tended to give contrary results. So the issue remains in some doubt. The striking evidence of the continuing wide disparities among countries in their per capita incomes suggests that, if there are tendencies toward convergence, they are weak or variable in their effects.[10]

The weight given to the econometric tests of convergence is, to some extent, a matter of intellectual taste, although there have been a number of quite rigorous criticisms of the methodology of the tests as well as the applicability of the basic theoretical assumptions.[11] Many development economists would find it difficult to believe that the growth experiences of the various countries of the world satisfy the conditions on which the statistical tests of significance are based. Yet, there is, undoubtedly, some interest in trying to assess just how much the simple models can explain and there is some interest in pushing the econometric exercises further, to determine whether there are any regularities in growth as related to country size. A number of regressions were, therefore, calculated, for various groups of countries and independent variables, essentially redoing the simple convergence tests, adding population size as an independent variable. Table 2 presents results that are representative of these regressions.

Table 2
Tests of Convergence Incorporating Population Size[12]

Dependent variable: growth rate of per capita GDP from 1960 to 1985

IndependentVariables	Coefficient	Standard error	t
Real per capita GDP in 1960	-.0012298	.0001707	-7.203
Secondary education in 1960	.0067768	.0115931	0.585
Primary education in 1960	.0249379	.0070997	3.513
Government Consumption/GDP	.0090746	.0363943	0.249
Population	-.0000164	.0000206	-0.796
Constant	.0031466	.0056256	0.559

R-squared 0.4463

The results, in general, are like the Barro/Sala-i-Martin results. Only the coefficients on initial level of per capita GDP and the level of primary education in 1960 were significant. The sign on population size variable suggests a negative relation between growth and size, but was far from significant.

Other regressions, with alternative constellations of independent variables and for alternative groups of countries by size, with more or less the same results. When similar regressions were calculated, using the growth rate from 1970 to 1985 as the dependent variable, all of the above independent variables lost their significance. The population size variable was positive, but approached significance only for some population subclasses of countries and only when entered as the square or cube root of population. It is striking, however, that in most of the regressions, the population size variable, though not significant,

was negative in sign. The conclusion must nevertheless be that the regressions are not consistent with the hypothesis that there are no overall population scale effects on economic growth.

There is an older line of econometric investigation that is related to the issues discussed here. Starting in the late 1960's, Hollis Chenery of Harvard University, with a succession of collaborators searched and found common patterns of economic development in the country data. The results were not startling; for example, it was found that the share of agriculture in GNP fell and the share of manufacturing rose with higher levels of GNP per capita. It was also found that country size makes a difference, with the effects of higher per capita incomes less strong in small as compared to large countries. However, in these studies, the dividing line between large and small countries in 1960 was a population of 15 million. The median size country in 1970 had a population of less than 4 million people and about 83 per cent of all countries had less than 15 million people. So the results of Chenery and his collaborators are not very illuminating for most countries.[13]

The constant returns to scale assumption of the neo-classical model does not distinguish labor qualities and, thus, implicitly assumes that these qualities are not affected by the scale of output. In models with economies of scale, the effects of larger scale in increasing factor productivity are usually assumed to be associated with the characteristics of the different technologies employed at different output scales. In some of the models of the "new growth theory", externalities are assumed to affect labor quality and there is an old argument and considerable evidence that the scale of output does, itself and with no changes in technology, make a difference for labor productivity. The argument dates back at least to

Adam Smith, who argued that a worker's productivity depended on the degree of the worker's specialization or, in Smith's words, on the, "division of labor." According to Adam Smith also, that specialization, "must always be limited by the extent of the market."[14] In the present context, these arguments suggest that small countries are at a disadvantage relative to large countries because small markets will provide less opportunity for workers to specialize than exists in large countries and, as a result, workers will be less productive.

The Smith argument as applied to small countries is also subject to the qualification that the productivity differentials would not persist if there were perfect international labor mobility. In this case, labor would migrate to the site at which its productivity would grow fastest. That would, of course, imply depopulation of small countries, which, again, has not happened.[15]

The learning-by-doing hypothesis, due originally to Kenneth Arrow, may also be interpreted as an argument that small countries are disadvantaged relative to large countries.[16] In Arrow's model the productivity of capital depends on its accumulated output experience. Since the accumulated experience in production in small countries, will generally be less than in large countries with larger markets, the productivity of capital, and, perhaps, labor, would also be lower than in large countries.

There is a variation or specification of the Adam Smith's hypothesis and the learning-by-doing hypothesis that often turns up in discussions in small countries. The point is made that there are skills that depend not on the accumulated experience of workers, which would be the learning-by-doing reasoning applied to human capital, but on the intensity of recent experience. This might be called the "cardiac surgeon" conjecture about labor productivity.

It is well-known that for cardiac and other types of surgery, the casualty rate is lower in large hospitals and for surgeons who perform the surgery very frequently and have constant intense practice, as compared to hospitals and surgeons who perform this type of operation rarely. To put the argument another way, it maintains that some skills are lost, if not used constantly and intensively, and, put this way, it is a familiar argument.

The Smith/Arrow hypotheses would not apply to skills used in sectors of small countries that are successful in exporting into international markets. That would create ample scope for specialization. However, not all goods move in international trade. There are many non-traded goods, produced and consumed only at home, that require different skills than the goods traded internationally. Or, even if the skills are the same, it is still possible that the scale of production would be too small to achieve the highest levels of labor skill and capital productivity. Among the non-traded goods and services are important professions, repair and construction services. While it may take only one person to repair the copying machine, in order for that person to achieve the highest level of skills, it may be necessary to specialize on one or a few brands of machines. If there are only a few machines of each brand in a typical small country, the copy machine repair person in the country will never achieve the level of skill of repair persons in a larger country.

The same type of conditions prevail in certain types of construction activity. Building conventional houses is relatively easy. Installing new technical innovations in those houses or building new production facilities may require skills that are not acquired without substantial experience. The first time a computer specialist sets up a computer network, it is a learning experience. The more times it is done, the faster and better the process becomes. But small

countries provide fewer opportunities for practice.

It is difficult to find the detailed data that would provide an adequate empirical test of the relation between labor productivity and country size. Using the aggregate data that is available on GNP and labor force, tests were made of the relation between economy-wide labor productivity and population size. Interestingly, with one exception, labor productivity is higher in successively larger size classes. That holds in 1960, 1970 and 1990. The exception is the second size class, which has about 25 countries including Barbados, Trinidad, Iceland and Luxembourg. If these countries are removed from that group, it conforms to the general pattern. Although these numbers do not, of course, confirm the speculation that larger countries have an advantage in training and using specialized labor, neither are they inconsistent with that speculation.

Turning now to the economics literature that focuses specifically on the problems of small countries, a number of ideas have been put forward, which are most often hypotheses about specific economic features, rather than complete theories. While "smallness" is never defined precisely in these theories, it is usually clear from the context, that the Caribbean islands, or countries like them, are of the scale being considered. That would include countries up to the size of Jamaica, with slightly less than 2.5 million people, which is about the lower third of the size distribution of countries.

Perhaps the most prominent among the propositions is the one that foreshadows the new growth theory. It is that small countries cannot take advantage of economies of large scale production. Two implications of this argument appear to be widely believed in small countries. First, there is the implication of the argument is that there are barriers or limits to

the ability of small countries to achieve economies of large scale production by selling in international markets. Secondly, small countries cannot obtain through their imports the benefits of production abroad with economies of scale.

The first implication is based on the judgment that, with the exception of the natural resource extraction industries, to which multinational firms will be attracted, there are major barriers to the establishment of an export industry on a large scale. With relatively small levels of local saving, a large firm would require access to relatively large financial markets, which means, in this instance, international financial markets. International finance is mobile and it is conventionally asserted to be provided competitively. If it is so, then firms in small countries would be at now special disadvantage because of their location. However, the anecdotal evidence adduced by writers on the subject suggests that is not the case and firms in small countries find it relatively difficult to obtain finance. While examples can be given of the opposite, the most obvious among them are in the exploitation of natural resources that have international markets.

Large scale production for international markets also requires a range of professional expertise, from engineering to marketing. Expertise is not a free good and is not perfectly mobile even at high wages. A first class engineer in Schenectady, New York might be easily attracted by an offer of a job in a small island country in the Caribbean, but it is likely to be much more difficult to move the person if the islands are 10,000 miles away.

As to obtaining benefits through international trade of production abroad with economies of scale, the common opinion in small countries is that they are subject to the monopoly power of large foreign producers. This is, no doubt, sometimes true. Since the

size of the markets are small, it is plausible that there would be more "natural monopolies" than in large countries. For example, the local market for petroleum products may be too small to warrant two separate distribution facilities.

Suppose that a new enterprise in a small country manages to overcome the obstacles to large scale production and produces at competitive costs for domestic and international markets. That does not end the problems that the small country will have with such an enterprise. First of all, such a firm will be large, relative to the domestic market, and will, therefore, have both monopoly power, if its output is sold locally, and monopsony power in purchasing local inputs. Monopolies and monopsonies cannot be expected to be more benign in a small country than they are in a large country. Again, Adam Smith provided a warning on this score.[17]

The monopsony power of large firms in small countries helps explain why they often become a focus of public and political pressures. Of course large firms recognize this in advance and it becomes an additional risk associated with their investment in small countries. There are many stories of corruption associated with this kind of situation.

There are also larger costs from monopolistic competition in small countries. When firms use advertising and other devices to differentiate their product from actual or potential competitors, they gain some market power. This makes it attractive for local retailers, even in small countries, to acquire a market niche through a franchise to sell an internationally advertised product. International producers are, presumably, willing to supply the small retailers, because they bear no extra costs.

Differentiated products require differentiated inventories of the product and, if

maintenance and repair are required, differentiated skills. All of this drives up the costs. But, every other retailer of competing brands will have the same costs and so all will have the same cost burdens and all will be more or less equally competitive, unless some firm should get really large, relative to the others. In any case, it is the consumer who suffers and, one way or another, it shows up in per capita incomes.

Small countries have, of course, often gained a niche for themselves, sometimes even a commanding presence, in world markets for particular agricultural and other primary products. Sugar, bananas, spices, bauxite and phosphates are obvious examples. This has some disadvantages as well as advantages. An economy that is dominated by one or two export commodities is like an individual have an investment portfolio that is undiversified. As a result, it is particularly exposed to the vagaries of the market place and the ups and downs in the prices of their products.

Tourism is like the export of one of the primary commodities; it depends on natural, local conditions plus efficient organization to make them available for use by foreigners. Like primary commodities, there is a lot of competition in the field and a good deal of price variability. While primary commodity supply may be subject to the whims of government tax and royalty policy, tourism can suffer from the random or purposeful violence of a handful of individuals, all of which introduces another source of risk. The Caribbean islands are familiar with the consequences of local political unrest spilling over into the tourists' world.
Why don't firms in small countries reduce their risk by diversifying their investments. The extent to which they can do that locally will depend again on economies of scale. If investments in small countries are riskier than in large countries, there must be more

diversification. That means pushing into activities that are, otherwise, less productive, simply in order to reduce risk. What about diversification, by investing abroad. That is a good idea for the owners of firms, but not an idea that helps the ordinary workers. They have only small amounts of savings and would not gain much from depositing those in foreign banks or buying foreign stocks, even if they knew how to do that. They depend on their labor for the overwhelming part of their income. There is no way these workers can diversify the use of their labor and the sources of their wage earnings, other than through working small farms and backyard gardens in their off hours. That sort of thing is not going to generate much income growth.

There is still one more economic condition on the supply side that creates obstacles for many small countries in gaining skills, achieving efficiency in production, and diversifying assets. It is the difficulty and cost of transferring information and expertise. There is a romantic notion, to which many economists appear to subscribe, that public knowledge is costless to acquire, as if all that is required is a book and a candle to provide the light by which to read. If it ever was true, it is certainly not true now.

Bringing information together and presenting it in a timely and convenient manner has a cost. It is not even easy to know what kinds of information are available that are relevant to the problems that have to be resolved. There is also a great deal of important information that is not published or that requires considerable expertise to interpret, if it is published. Suppose, for example, that a firm making computers and computer calculating chips announces a breakthrough, as they often do, and that the potential speed of computation has been increased. What does that information mean for someone in Barbados who is thinking

of buying a computer? It requires some expertise to interpret and project the consequences. Or suppose that there is an announcement in the newspapers that the Chinese government plans to construct a major new port. China is one of the fastest growing and largest markets in the world. What does the announcement mean for the bauxite industry in Jamaica? Small countries are at a disadvantage in answering such questions. The public institutions and private firms that specialize in the transfer of knowledge and expertise are rare in small countries, whose markets cannot support the range and depth of expertise that exists in large countries.

The disadvantages of small countries in achieving economies of scale in the production of important non-traded goods are often noted. The effects of relatively small scale and high cost production can be pervasive and will affect the potential for international as well domestic trade. For example, there are important economies of scale in electric power production and other public utilities. Five hundred megawatt plants, based on coal, oil, or natural gas produce at lower cost per kilowatt than do 100 megawatt plants, which produce at much lower costs than do 10 megawatt plants. This also suggests a reason why small continental countries may avoid some of the disadvantages faced by small island countries. If the small continental countries are part of a larger continental power market, they can, in principle, get power more cheaply than otherwise.

Another argument that has been made about economies of scale is that they are important in the provision of government services, which are a kind of non-traded good. According to the conventional story, small countries need the same components of government as exist in large countries: finance ministries and parliaments, foreign ministries

and justice departments. The scale of operations of some of these, prisons, for example, depend at least partly on population size. However, the costs of operating a foreign ministry for a small country involve many of the same costs as the embassies of a large country. On the other hand, there are offsets to any economies of scale in government services in large countries. Small countries may have fewer layers of government than large countries which, in addition to city and town governments, can have county, state, provincial and even regional units. Such proliferation of government levels would tend to offset scale economies in particular functions.

It is difficult to test the hypothesis that the costs of government are higher in small countries, since only the inputs and not the output of most government services can be measured. Although the evidence on the cost of government in countries of different size is not complete, it may provide some insights. If government is more expensive in small as compared to large countries, then one would expect either that government would absorb a larger share of the GNP of small countries or that there would be fewer or lower quality

Table 3
Tests of Share of Government Consumption[18]

Dependent variable: government consumption per capita

Independent Variables	Coefficient	Standard error	t
GDP per capita	0.111984	.0013636	82.125
Population	-5.555503	14.59742	-0.381
Constant	-1784.095	1211.404	-1.473
R-squared 0.9838			

government services. Unfortunately, the data do not permit the discrimination between these two effects.

Table 3 presents results of a regression intended to determine the comparative effects of GDP per capita and population size in determining the share of government consumption expenditures as a proportion of GDP. Clearly GDP per capita is very significant and population size is not significant at all, although the negative sign on the population coefficient suggests the possibility of an inverse relation between population size and per capita government consumption expenditures in some cases.

There are also undoubtedly sociological differences among small and large countries that have economic consequences. For example, on the plausible asssumption that the number of acquaintanceships of an individual is not related to country size, the circle of each person's own acquaintances in a small country will encompass a larger proportion of the population than in large countries. In small countries, for a particular age and education cohort, this circle of acquaintanceships may become a substantial portion of the group. This may, in turn, have economic significance since personal relationships make a difference in many kinds of transactions. For example, in theorizing about economic transactions, economists distinguish between one-shot games and repeated games, that is, between economic interactions among agents that are not repeated and economic interactions that are repeated. When there are fewer agents in the market, as in small countries, there will be more repeated games. In these conditions, personal reputation becomes more important than in large countries.

There is also an argument, made by Paul Streeten, that small countries are more likely

to avoid some of the "free rider" problems of large countries. The "free rider" problem arises in situations when goods and services are made publicly available, without a binding commitment for compensation by the recipients. A music concert in a public park by a volunteer group can be enjoyed without making a contribution to its support. An increased willingness to accept responsibility for supporting such benefits and/or greater social pressure to do so, that may exist in small countries, will result in reduced free riding. However, this depends heavily on the particular culture.[19]

V. Why do small countries think that they are disadvantaged?

Whatever the reality, it seems to be a common belief in small developing countries that they are at a disadvantage. It is, for example, widely believed that small countries are relatively neglected, which provided the rationale for the United Nations Conference on the Sustainable Development of Small Island Developing States. It would be plausible if it were so. In the triage that takes place in a world of limited resources, it would not be unexpected if the international financial institutions, the International Monetary Fund and the World Bank, did not assign their most highly qualified personnel to small countries, but rather to big countries, like the former Soviet Union and Brazil and Nigeria, whose impact on the world economy is also large.

Three previous examinations of the distribution of economic assistance by country size indicate that, in general, the opposite is true. Larger countries tended to receive less economic assistance per capita.[20] To try to obtain the clearest result, this type of investigation was repeated, with some variations, with the results shown in Table 4. Regressions were estimated both for official credits and concessional aid. The former type of assistance are

loans on terms that approach commercial credit levels. Concessional assistance, however, is, to a large extent, a pure gift or grant. Sometimes it is motivated by the desire to help in the economic development process without much, if any, expectation of gain by the grantor. It has often been given with political motives: to gain influence in a particular region, to bolster a favored political party or to offset the influence of another large country competing for influence. It is sometimes given, as well, in cases of natural disasters.

To determine whether the size of a country made a difference in the amount of official credit and concessional aid that it received on a per capita basis, these variables were regressed on population size and, to take account of the poverty effect, GNP per capita, using data from 1970 to the present. The results are shown in Table 4. The test shows that the population size variable, though significant only at the 10 per cent level, is consistently negative, indicating that the smaller the country, the more official credit and concessional aid it received on a per capita basis.

On the other hand, the tests also indicate that, rather perversely, the higher the per capita GNP, the higher the levels of official credit and concessional aid per capita, though this variable was significant only for official credit.

In both cases, however, R^2 was rather small, indicating the variables used explained a relatively small portion of the variance in the dependent variable. Thus, in another version of the same test, additional independent variables were included. Because of special concern about Africa and the Caribbean, dummy variables were added for countries in these regions. Then, in order to take account of political motivations, another dummy variable was added for countries in which the U.S. has indicated a special national interest.

Table 4
Tests of Allocation of Official Credit and Concessional Aid[21]

Dependent variable: official credit per capita

Independent variables	Coefficient	Standard error	t
Population	-4.04 e-06	2.26 e-06	-1.785
GNP per capita	.4976264	.2085938	2.386
Constant	3192.39	460.7488	6.929
R-squared 0.0897			

Dependent variable: concessional aid per capita

Independent variables	Coefficient	Standard error	t
Population	-2.78 e-06	1.54 e-06	-1.809
GNP per capita	.1356578	.1417087	.957
Constant	2165.664	313.0107	6.919
R-squared 0.0439			

Dependent variable: official credit per capita

Independent variables	Coefficient	Standard error	t
Population	-3.21 e-06	2.16 e-06	-1.491
GNP per capita	.3469957	.2208772	1.571
Dummy variables			
Africa	237.168	740.9984	.320
Caribbean	3138.982	887.5043	3.537
U.S.clients	3369.021	1187.182	2.838
Constant	2575.396	657.4258	3.917
R-squared 0.2506			

Dependent variable: concessional aid per capita

Independent variables	Coefficient	Standard error	t
Population	-2.13 e-06	1.50 e-06	-1.421
GNP per capita	.0668729	.1538285	.448
Dummy variables			
Africa	333.7273	516.0637	.647
Caribbean	2056.669	618.0968	3.327
U.S.clients	1664.862	826.8056	2.014
Constant	1677.874	457.86	3.665
R-squared 0.1727			

In both the regressions for official aid and concessional credit, when regional dummy variables and the political variable are added, the population and GNP per capita variables become less significant, although their signs do not change. The regional variable for Caribbean countries and the political variable are quite significant in both regressions, while the dummy variable for African countries is not. The R^2 increases substantially in both regressions as compared to the prior regressions.

Of course, the regressions prove nothing, as regressions never do. These are deficient in that there are other influences that are not taken into account. Nonetheless, they are suggestive. The inverse relation with population size of official credit per capita and concessional aid per capita, found in other studies, turns up here as well, but with less significance. The positive relation with GNP per capita suggests that economic assistance has not been consistently related to a country's relative poverty. The Caribbean countries appear to be treated better than other countries, on the average, and U.S. client countries as well. The latter is particularly surprising as the official credit and concessional aid variables includes funds from all sources, not just the U.S..

Why then is there this persistent view that smallness is a real disadvantage? There may be some truth in it, as has been pointed out, but there may be other sources as well. Much of the grumbling comes from the Caribbean, although it would, I believe, be difficult to document this. One clear, though inconclusive test, however, would be to examine the authorship of the books and articles about the obstacles to economic development due to smallness. Unfortunately, this is not an easy test to make. Library collections are, of course, dominated by works in English and favor U.S. authors and those from adjacent areas. Thus,

the finding may be misleading that authors from the Caribbean are more prominent in this literature than authors from any other region.

The discontent may arise from the fact that, for the Caribbean, England and the United States may serve as the reference points for Caribbean intellectuals. The U.S. per capita GNP is three and a half times and the U.K.'s GNP per capita is two and half times that of Barbados. However, the islands are close, geographically, to the U.S. and socially and culturally to both the U.S. and to England. So it is natural for Caribbean economists to ask why their countries should be at lower income levels. There are good reasons, perhaps most importantly in the physical and human capital endowments in England and the U.S.. But those reasons may seem somewhat remote, as compared to the facts of country size.

V. The future for small countries

Predictions are risky but unavoidable and the act of making predictions is, itself, a useful exercise in that it requires drawing out the implications of ideas and theories. There are reasons to believe that, in some ways and some places, the future will be easier for small countries than the past, but, in some ways and places, it will be much more difficult. There are especially difficult cases among some of the small island countries in the Pacific that have lived on grants from the United States since World War II. Their populations have grown rapidly and almost literally eat up their income and transfer payments with obesity rates and diabetes rates among the world's highest. Their levels of educational achievement are low; they have poor agricultural prospects and have virtually abandoned the fishing if their rich ocean areas. The U.S. grants are scheduled to decline in the near future and, as a result, the islands face not just an inevitable decline in living standards, but real disaster,

unless there are major adjustments. Presumably there will be such adjustments and emergency assistance so there will not be literal famine. But the adjustments will be painful and the only hope for many of these people will be migration, facilitated by easy entry into the U.S..

In a less dramatic way than in the Pacific, increased emigration from small countries to large countries is likely in a number of other places, unless blocked by explicit policy. Increased international communication will demonstrate more and more vividly the income differences that prevail and higher incomes will make it easier to finance migration. In Africa, the migration pressures are clear in many smaller countries, as is the forced repatriation of migrants by countries that try to ameliorate their economic and political problems. Migration will not have an entirely bad effect on the small countries. It is true that they will lose some of their talented citizens, but those citizens typically send back remittances. In addition, as is happening in Jamaica now, the migrants may return to their home countries to retire and bring back with them significant amounts of foreign funds.

There are two sectors whose future development will particularly affect small countries. The first is transport. Continuing technical innovation will reduce transport costs, which may or may not be offset by increases in fuel costs, depending on future supplies and demands. Transport costs are a small part of total costs for many goods, but are still a large part of the costs of tourism, so any reductions in transport costs will have a major impact on that sector. Communications is the other sector in which cost reductions will be of particular importance for small countries. Improved communication will decrease the isolation that burdens many small countries. E-mail connections via satellite transmissions will be even more convenient

than the short wave broadcasts on which many small, isolated countries still depend. While the populations of the world may not soon be, figuratively, walking arm-in-arm down the information superhighway, communications will become much cheaper and quicker. It is too early to foresee clearly all the consequences of that change. One can read futuristic stories about the world classroom, in which all third-graders or all college freshmen simultaneously watch the world's great teachers on their TV screens. The most formidable obstacle to this development may not be technical but, rather, strong local preferences with respect to course content.

Yet it is possible to already see in some places the kinds of patterns that will emerge from lower transport costs and better communications. For example, computer software companies in the United States hire computer programmers in India and the former Soviet Union and communicate intensively back and forth about their work. Garment firms in New York send new designs, specifications and cloth to Shenzen in China and in a week or two have the finished products in their stores. Flowers picked in Colombia or Jamaica can be in a store in the middle of the U.S. the next day. It is reasonable to expect that transactions of this type will increase.

With respect to the future importance for small countries of economies of scale, there are no obvious, general answers. There are, however, examples in many types of production of influences that will tend to reduce their importance. Smaller production runs economize on inventories and have become more economic as transportation and communication speeds have increased. This tends to reduce the advantages of carrying large inventories and, therefore, the advantages of large scale production.

VI. Conclusions

Well then, are the tourist posters right? Are small countries happier and cozier? To go beyond the tourist posters, are there disadvantages that small countries face in the processes of economic development that are greater than any advantages? For the most part, this survey confirms many of the forebodings of previous studies and adds a few more. However, it has not been possible to provide specific dimensions to these forebodings and make them into quantitative assessments.

On the average small countries may well face some disadvantages in the development process, but they seem likely to be less important in the future than in the past. This does not mean that some small countries do face particularly difficult problems, but that is true for some middle-sized and large countries as well.

The survey suggests that it is a mistake to think that small countries are simpler than large countries, in their economies or societies, a mistake which is often made. An example of this mistake is provided by a quoting a comment of a past governor of a central bank in the Caribbean area, who was reported as saying that, "a small country does not need sophisticated economics." That is quite wrong. Small countries do not have fewer or easier problems than those of large countries. They have many of the same problems and some different and more difficult ones as well.

FOOTNOTES

1. It is interesting to note that Caribbean economists have been the major contributors to the analysis of small countries. The book by W.G. Demas (1965) of Trinidad and Tobago is an early and important example.

2. The essays collected in E.A.G. Robinson (1960) were an early contribution to the subject. Subsequent articles and articles and books by S.B. Saul ( ) and W.G. Demas (1965) continued the study of small countries. Recent papers by T.N. Srinavasan (1986) and Paul Streeten (1993) advance the analysis.

3. This might also be called the, "fractal," view of country size, in the sense that careful inspection of any component of the size distribution of countries would reveal that it reproduces the pattern in any subcomponent or larger grouping.

4. Source: World Bank, (1994).

5. The data do not include Brunei, that does not report its GNP per capita, which, reputedly, is very high.

6. Robert M. Solow, (1956)

7. Paul A. Samuelson, (1948).

8. There were 123 listings of articles on economies of scale in the economics literature from 1990 to 1994.

9. See Robert J. Barro, (1991) and Robert J. Barro and Xavier Sala-i-Martin, (1991).

10. Andrew Bernard and Steven N. Durlauf, (1993) provide an excellent review and resolution of the issues involved in the alternative tests.

11. See D. Quah, (1993)

12. GDP and population data were taken from the Penn World Tables and enrollment and government consumption data from the World Bank, World Tables.

13. See H.Chenery and L. Taylor (1968).

14. Adam Smith, The Wealth of Nations, The Modern Library, 1937, p. 17.

15. It is true that, where migration is possible, it does result in some small countries, including countries of the Caribbean, losing a substantial portion of their workforce. No test could be found of the propostion that, adjusting for labor quality differences, the migration had equalized incomes in the sending and receiving countries.

16. K. Arrow, (1962)

17. A.Smith, ibid., p. 595.

18. GDP, government consumption and population data were taken from the World Bank, World Tables.

19. For examples, see E.Banfield, (1958) and P. Streeten, (1993).

20. Barend A. de Vries, (1975), P. Isenman, (1975) and Snyder, D.W., (1993).

21. GDP data were taken from the Penn World Table and population data from World Bank, World Tables.

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